



NITROBENZENE

CAS # 98-95-3

Agency for Toxic Substances and Disease Registry ToxFAQs

July 1999

This fact sheet answers the most frequently asked health questions (FAQs) about nitrobenzene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Nitrobenzene is used mainly as an intermediate to produce another chemical. Repeated exposures to high levels result in a blood disorder in people. This chemical has been found in at least 7 of the 1,177 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is nitrobenzene?

(Pronounced nī'trō-bě'n/zēn)

Nitrobenzene is an industrial chemical. It is an oily yellow liquid with an almond-like odor. It dissolves only slightly in water and will evaporate to air.

It is produced in large quantities for use in industry. Most of the nitrobenzene produced in the United States is used to manufacture a chemical called aniline. Nitrobenzene is also used to produce lubricating oils such as those used in motors and machinery. A small amount of nitrobenzene is used in the manufacture of dyes, drugs, pesticides, and synthetic rubber.

What happens to nitrobenzene when it enters the environment?

- ☐ Very low levels of nitrobenzene may be found in air.
- ☐ It may be present in water from industrial releases.
- ☐ In water, nitrobenzene will be broken down by sunlight.
- ☐ Nitrobenzene in soil can move into the groundwater, be taken up by plants, evaporate to the air, and be broken down by bacteria.
- ☐ It does not appear to concentrate in fish or other aquatic animals.

How might I be exposed to nitrobenzene?

- ☐ Breathing air containing it.
- ☐ Living near a factory where it is used.
- ☐ Working in a factory that produces nitrobenzene.
- ☐ Living near a hazardous waste site where it has been disposed of.
- ☐ Working as a chemist or in other occupations where nitrobenzene is used.

How can nitrobenzene affect my health?

A small amount of nitrobenzene may cause mild irritation if it contacts the skin or eyes directly. Repeated exposures to a high concentration of nitrobenzene can result in methemoglobinemia, a condition in which the blood's ability to carry oxygen is reduced. If you have this condition, your skin may turn a bluish color and you may have nausea, vomiting, and shortness of breath. Effects such as headache, irritability, dizziness, weakness, and drowsiness may also occur. There is also some evidence that breathing high concentrations of nitrobenzene may damage the liver.

Animal studies have reported effects on the blood and liver from exposure to nitrobenzene. A single dose of nitro-

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benzene fed to male rats resulted in damage to the testicles and decreased levels of sperm.

How likely is nitrobenzene to cause cancer?

No studies are available on whether nitrobenzene causes cancer in people. In animals, breathing nitrobenzene resulted in an increase in liver, thyroid, and kidney tumors.

The International Agency for Research on Cancer (IARC) has determined that nitrobenzene is possibly carcinogenic to humans.

Is there a medical test to show whether I've been exposed to nitrobenzene?

Nitrobenzene reacts with red blood cells in the body to produce methemoglobin. If you have recently been exposed to nitrobenzene, the level of methemoglobin in your body may be elevated, and this can be measured. However, since other toxic chemicals also produce methemoglobin, this method does not definitely show that you were exposed to nitrobenzene.

In cases of long-term exposure to nitrobenzene, the presence of its breakdown products, p-nitrophenol and p-aminophenol, in the urine indicates nitrobenzene exposure. These tests require special equipment and cannot be routinely done in a doctor's office. The results of these tests cannot be used to determine the level of nitrobenzene exposure or if harmful health effects can be expected to occur.

Has the federal government made recommendations to protect human health?

The EPA recommends that levels in lakes and streams should be limited to 17 parts of nitrobenzene per million parts of water (17 ppm) to prevent possible health effects from drink-

ing water or eating fish contaminated with nitrobenzene.

The EPA requires that discharges, spills, or accidental releases of 1,000 pounds or more of nitrobenzene must be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) has set a permissible exposure limit of 5 milligrams nitrobenzene per cubic meter of air (5 mg/m³) for an 8-hour workday in a 40-hour workweek.

The American Conference of Governmental and Industrial Hygienists (ACGIH) and the National Institute for Occupational Safety and Health (NIOSH) also recommend an occupational exposure limit of 5 mg/m³ for nitrobenzene.

The federal recommendations have been updated as of July 1999.

Glossary

Carcinogenic: Able to cause cancer.

Evaporate: To change into a vapor or a gas.

Milligram (mg): One thousandth of a gram.

National Priorities List: A list of the nation's worst hazardous waste sites.

Pesticide: A substance that kills pests.

ppm: Parts per million.

Tumor: An abnormal mass of tissue.

Source of Information

Agency for Toxic Substances and Disease Registry (ATSDR). 1990. Toxicological profile for nitrobenzene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Animal testing is sometimes necessary to find out how toxic substances might harm people and how to treat people who have been exposed. Laws today protect the welfare of research animals and scientists must follow strict guidelines.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-639-6359. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

